RELATIONSHIP BETWEEN FINANCIAL AND REAL SECTORS: IMPLICATIONS FOR STABLE ECONOMIC DEVELOPMENT [EVIDENCE FROM THAILAND]

Muhammad Azhar Khalil

A Thesis Submitted in Partial
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ABSTRACT

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Economic real sector is essential for growth and development as its activities persuade progress of economic output. The sector generates better outcomes if it is accompanied with a healthier financial system; thus, advancement of financial sector is a means for the growth of real sector. This study reexamine the relationship between financial and real sectors of Thailand with the volatility analysis of GDP caused by development of financial market. The GARCH Model, Johansen-Juselius (1990) co-integration test, and vector error correction model (VECM) approach were employed on time series data over the first quarter of year 1993 until the second quarter of year 2017. Consistent with past studies, both the elements of capital market (i.e. bonds and stock markets) and the money market (i.e. credit to private sector by banks) bear a positive relationship to the GDP. Our results show that both markets help promoting economic growth. We can infer that differences in financial market composition and institutions do matter, as these three major sections – bond market, stock market, and banks– do not simultaneously develop and grow, but at a different level of their growth paths they complement each other. Our findings suggest that there exists interdependency between real sector and financial sector which in turn enlightens the effect of financial market development on the GDP growth.

Keywords: Financial Sector, Real Sector, Stock Market Capitalization, Bond Market, Volatilities, GARCH Process

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Muhammad Azhar Khalil

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CHAPTER 1
INTRODUCTION

1.1 Significance of Study

The mediums through which economic growth accelerate by financial development have been conferred in the literature extensively. Relevant theories can be illustrated through different approaches like optimistic (popular in 1990's and 2000's) and skeptical (common later 2000). In accordance to former approach, a sound financial system is characterized by savings mobilization and allows the resource allocation efficiently (Greenwood, Sanchez, & Wang, 2010; King & Levine, 1993), facilitate to invest in high returns portfolios and allowing to have lower risk by investing in different projects (Bencivenga & Smith, 1991; Saint-Paul, 1992), helps to boost innovative activities and decrease renting agency costs (Aghion, Howitt, & Mayer-Foulkes, 2005). Financial innovation causes price change that can give rise to non-degenerate types of participation turnover, i.e. the introduction of a new assets attracts some agents to step in to financial markets to cope their income risk (Calvet, Gonzalez-Eiras, & Sodini, 2004). In relation to the latter approach, development in financial sector can be a cause of greater systemic risk eventually (Allen & Carletti, 2006; Kapadia, Millard, & Perez, 2008; Gai et al., 2008; Wagner, 2007), upset economic capability (Zeira, 1999), application of unproductively greater economic cost (Santomero & Seater, 2000), substandard lower savings rate (Jappelli & Pagano, 1994), or the greater labor allocation to financial sector sub-optimally (Bolton, Santos, & Scheinkman, 2011; Philippon, 2007).

Domestic financial markets in emerging economies are usually under-developed, when there is a liquidity shock, government bond markets would be illiquid and countries starts losing their access to international credit (Gonzalez-Eiras, 2003). Taking into consideration the causal effects of financial sector development, it is needed to consider this sector together with stage of development of other sectors that facilitate in growth process. If financial deepening for instance; leads systemic

risk increases due to huge investments' allocation towards risky projects, the production capacity of the economy might be expand in the real sector from technological development and demand from efficient firms releases for more finances (Ductor & Grechyna, 2015). This may decrease the likelihood of crises from systemic risk, raise average growth rates and let the economy stabilize. Apart from these arguments, plenty of skilled labor attracts if greater rent caused by disproportionately rapid progress in the financial sector, therefore, exogenous technological developments in rest of the sectors can restore and allocate the labor optimally. As explained, such as by Murphy, Shleifer, & Vishny (1991) for the growth rates of an economy to be sustained, it is essential to have optimal labor allocation among sectors. Likewise, if advancement in financial sector leads to reduction in savings resulting from interest rates dampening, opposite influence from technological development in real sector leads to increase the interest rates consequent from rise in demand for funds. Accordingly savings in turn, (Ductor & Grechyna, 2015) depict the level of capital accumulation, subsequent output level and growth rates of the economy. Hence, there is need to understand the importance of linkages between both financial and real sectors that could be significant for the overall progress of the economy to uphold an obvious influence on economic development.

Empirical researches frequently analysis the link among financial sector advancement and real development of the economies as new empirical tools, models and datasets developed and become available. In this study, we would like to explain the momentum through which development of real and financial sectors have an effect on economic growth. As yet, there is least evidence available regarding the importance of development of financial sector for the real sector's development of the economy, we can fill this gap to record its impact and bring the historical impact on lines so governments can develop effective policies accordingly.

1.2 Background with the Perspective of Thai Economy

Thailand has showed remarkable performance in both social and economic development during last four decades, changed her status being a low income economy to an upper middle income country during 2000's. Discretely, Thailand

revealed so many success stories in growth with persistent strong development particularly during 1980s with remarkable reduction in poverty.

The average annual growth rate of Thailand has remained at 7.5% during boom years from 1960 to 1996 and remained 5% as measured by real GDP following from financial crisis in Asian economies from years 1999 to 2005, facilitated to pull thousands of individuals out from poverty by creating lots of jobs. Progresses beside several measures of welfare have stood inspiring, currently many more children are attaining education at higher levels and nearly everyone now a day covered by means of health insurance while various other types of social security plans have prolonged. Later on average growth rate reduced to 3.5% from 2005 to 2015 with a drop to 2.3 % during 2014 to 2016. Thailand is nowadays running on the track to recovery. As on 2017, growth rate reaches at 3.65% and expected to grow further up to 3.7% in year 2018.

Substantial decline in poverty have taken place over the last 3 decades from 65% during 1985 to 7.5% in year 2015 in the high growth phases with the increasing prices of agricultural products. Though, inequalities in different regions and poverty keep posing challenges, with susceptibilities causing agriculture prices to fall down and ongoing deficiencies as a result of uncertain growth of the economy. More than 80% of country's 7.3 million poor recorded in 2014 who lives in rural zones. Even though inequality has dropped over the past 30 years, but within and across regions of Thailand, still crucial and rising gaps in the income and consumption of household can be seen, with the bags of poverty outstanding in the areas of Deep South, North and Northeast.

Thailand has set out its long term goals for the economy in its [20 Years National Strategy Plan (2017–2036)] for achieving the status of being developed country by comprehensive reforms. These reforms will address stability of the economic, human capital investments, equivalent economic opportunities, financial liberalization, competitiveness, sustainable environment, active government administrations and last but not least a healthier financial system to finance, secure and support all these reforms. Current reforms will back by the financial sector for the implementation and support of big multi-years public infrastructure projects associated to the dual tracking of railway, regulatory developments aimed to improve

ease of doing business in Thailand, incorporating State Enterprises Policy Committee to expand state owned enterprises governance, transfer of regulatory oversight of specialized financial institutions to the Bank of Thailand (World Bank, 2017).

1.3 Statement of Problem

The real sector of an economy is the key section as activities of this sector persuade economic output and is represented by those economic sectors that are essential for the progress of the economy. The sector is crucial for the sustainability of the economy because of its productive capability to meet nations' aggregate demand (Oluwafemi & Olufemi Adewale Aluko, 2015). The real sector generates better outcomes if accompanied with a healthier financial system; thus, advancement of financial sector is a means for the growth of real sector. One of the key determinants of economic development is the growth of financial sector. Though, because of the wide description and inter-dependence to certain other areas of economic development, there is unclear influence of financial advancement on economic development (Ductor & Grechyna, 2015).

The stock exchange in Thailand established in 1968, since that the stock index was at 100 points when stock market opens its operation. Up to this point the index is at 1700, it grows 17 times from year 1968 to 2017 in almost 50 years. Besides, in 1997 the index dropped from 1600 to 200 points and loses its value because of the financial crises. Thailand experienced movements in its stock market in different times. The question is if financial sector provides financial services to the real sector, it will support real sector to grow. However, what if the financial sector is actually doing something by its own and real sector does not need financial services but the financial sector does have or what could be happen if it grows too fast? It will be very easy to get the loans because financial institutions can print lot of money and that can lead to the more speculations. Say, somebody gets money from the bank, buys the stock from the financial market and speculate instead of investing into any production activities, there is nothing related to the real sector as everything is going within financial sector. What we normally think is that after getting money from the bank, someone put the money into the factories to produce something. In contrast, when an individual is getting money from the bank and speculate, there is chances of winning

or losing the money and what if lot of people do the same practice? In this case we don't have strong relationship between these sectors. Financial market can grow by itself and doesn't link to the real sector. This is actually happened in the hamburger crises in 2008 when banks do not provide loans because loaning the money to somebody in the real sector, banks get less returns than providing it to the financial sector. People involving in speculations with higher returns can negotiate with the banks to borrow the money at higher interest rate, that is happens even when the central banks actually doing quantity easing policy and they still have this problem. Banks would afraid to loan money out to somebody else, instead, the bank themselves go out and invest into the stock market.

Is it common to say that financial market supports the real sector, the argument could be yes because if the financial market actually setting up and provides services to the real sector whenever real sector needs any kind of financial services like capital, financial sector provides it or if the real sector need services to manage the risks, financial market comes in and provide some equipment or financial tools to manage their risks? Moreover, when the financial sector needs to improve efficiency and reduce cost, financial sector helps real sector to achieve the efficiency. So, if the financial markets do the job, then we can see the link between these two in this case. The real sector needs to take the leading role and financial sector will follow to responds the needs of real sector. If this is not the case, then it will go to another way and the question for us is the financial sector provides something that real sector does not need or the financial sector is going too fast? One of the argument is financial sector is growing but it's not contributing to the real sector and providing some products/services to its own where lot of people want of work in the financial sector because they get good returns even those who could work better in other segments of the economy.

We would like to have equilibrium between these two sectors and sometimes circumstances cause disequilibrium like financial crises 1997 and hamburger crises 2007-2008 both were caused by financial sector. Economic crises in the past basically inflation, energy, unemployment etc. those are the factors leads to economic crises. But the reason we had crises does not because we have high inflation or higher unemployment, it is because we have crash in the financial sector. That is why we

need to study this problem when financial sector grows, does it mean real sector is growing? Or they have any kind of relationship that we do not understand yet.

The reason we choose Thailand to study this issue is upon getting enough information in terms of the data sets, we would like to consider it separate before and after 1997 financial crises and see if the relationship is different. No one have studied this for Thailand before and we would like to know what would happen if we promote stock market, would it leads to growth in GDP, and many countries are trying to study this relationship.

1.4 Objective and Motivational Features of Study

The purpose of this research is to provide evidences about interdependence between financial sectors' indices (specifically; money market and capital market) and real sector of the Thailand's economy which represent by its GDP. Reason why the focus of our study is on financial sector is; since, during the period of financial crisis, mostly this sector remains affected (Kutan, Muradoglu, & Sudjana, 2012; Stiglits, 1999; Williams & Nguyen, 2005;). Likewise, when significant changes take place in the financial sector, the impact of these changes also affects real sector. As a result, it is very important to evaluate these changes by reviewing both sectors. Four questions we would like to explain raised by this study. **First**, is there any kind of relationship exists between financial and real sectors? **Second,** what are the effects of financial market development on the growth of the overall economy? **Third,** variations of GDP whether or not it can be explained by the development in the financial market? The study motivates to contribute new findings to the on hand literature by putting some lights on relationship between desired sectors. After Chapter 1, Chapter 2 reflects the cruxes of the empirical literature and conceptual model of the study. However, Chapter 3 contains the information about details source(s) of the data collection, methodological issues and specification of the model. Chapter 4 is for interpretation of results. Last Chapter offers concluding remarks and recommendation of appropriate policy.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Literature Review

The empirical reviews of literature illustrating the effect of financial growth on economic development, like theoretical studies, follow and determined by two general historical approaches; first one termed as optimistic (mostly admired during 1990s and 2000). King and Levine (1993), Raghuram & Zingales (1998), Levine, Loayza, & Beck (2000) are the representative of this approach. According to this approach, it seeks to justify the financial development and financial innovations as crucial measures for the strength of an economy and to achieve viable economic development. The development of this approach commenced during the period of rapid growth of the global economy in financial sectors' services and its liberalization.

The second approach in explaining the impact of financial growth on economic development, refers to skeptical (popular after 2000s) boomed after the financial crises from 1997-1998 and during 2007-2008. Many possible hazards of financial liberalization were highlighted by this approach. Specifically, after the great crises conclusions from the representatives of optimistic approach were on doubt shed by the studies (Raghuram G & Zingales, 1998)

The findings of King and Levine's (1993) re-evaluated through incorporating the models of threshold regression by Deidda and Fattouh(2002), results from their study endorsed the non-linear consequence of financial enlargement on the economic development. Employing data set of Raghuram and Zingales(1998), development in financial sector uphold a non-linear effects on economic development revealed by Manganelli and Popov (2013). In addition to these arguments, Cecchetti and Kharroubi (2012) analyses an inverted U-shaped outcome of financial sector's development. The effect of various kind of lending from financial institutions on

economic development depends on stage of banking sector's development of an economy (Owen & Temesvary, 2014).

While working on sample of East Asian countries, Ben Gamra (2009) argues that limited liberalization of financial sector bears significant positive impact on the economic development compare to full liberalization.

Kaminsky and Reinhart (1999) found that channels of financial development have plausible negative effect on economic development by triggering instabilities in financial sector. Because of financial instabilities, a positive long-run relationship exist among output and financial intermediation, whereas in short-run the relationship becomes negative (Loayza & Ranciere, 2006). Rousseau and Wachtel (2011) explain that irrespective of country's stage of development, a positive impact of financial growth get weakens with the passage of time.

Findings of Levine et al. (2000) re-estimated by Beck, Degryse, and Kneer (2014) and their findings shows that a greater financial sector tends to boost development and decreases uncertainties in long-run, however with the short runs' perspective it stimulates development at the expense of greater instabilities. Similar evidences found while directing for endogeneity problems of financial sector's development and employing numerous estimation methods by Arcand, Berkes, and Panizza(2012). Calderón and Liu (2003) argue that the contribution of financial deepening towards growth is more in developing economies compare to developed economies. While examine the European countries' sample, Masten, Coricelli, and Masten (2008) found the same results and describe that developing countries grow more from development of financial sector.

Rioja and Valev (2004) analyze a significant positive impact of financial deepening on economic development. Empirical evidences from the study of Ang (2011) suggest that liberalization of financial sector can leads to slow down the process of technological development resulted from reallocation of talent to financial sector from the modern sector that could be more innovative.

By taking into account the co-determination for development of financial sector and growth of real sector. This study will contributes to the empirical literature and highlight the important implications considering the significance of relationship between financial development and the economic growth of the economy.

2.2 Conceptual Model

In accordance with the theory of economic growth (founded by Lucas, 1988; Romer, 1986 and Solow, 1956), initial levels of the GDP, both physical accumulation of capital and the human capital development are key factors of per capita economic growth. The relationship should be positive between per capita economic growth and a level of human capital of an economy because greater human capital is characterized by innovative thoughts that foster rapid economic development. However, per capita economic growth supposed to be negatively correlated with initial level of GDP due to the convergence effect that is with the diminishing rate of capital accumulation, economies have to converge at their level of steady state. Moreover, in many empirical growth models, various other factors like economic, institutional, geographic, and political issues have been incorporated [for a broad survey, find (Durlauf, Johnson, & Temple, 2005)].

The empirical literature evaluating the effects of financial sector's advancement on economic development taking into consideration the specific sets of control variables relevant to the country's economic stability and the government policy: indicators of fiscal policy, measures of price stability and openness to global trade (find, as explained, Levine et al., 2000), together with the measures of financial deepening. Few years ago, in the growth regression, Arcand et al. (2012) incorporated a quadratic form of development of financial sector and found non-linear association among financial development and economic growth. Theoretical evidences of the non-monotone effects of financial liberalization on economic development could be comprehend in the following arguments:

1. Development of financial sector leads to a greater economic stability and can increase economic growth. Both financial liberalization and innovation in financial sector are captured by financial development and are the source of a more prosperous economies (Calderón & Liu, 2003), or could be reason of accumulated systemic risk (e.g., see Gennaioli, Shleifer, & Vishny, 2012; Wagner, 2007; Allen & Carletti, 2006). Numerous empirical and theoretical findings on this matter have revealed that financial development is crucial and leads to economic development.

2. Financial development may reduce economic progress resulted from misallocation of resources. A rapid growth in financial sector produces massive rents

and captivates the resources which could ideally be utilized in some other sectors (for instance, see Bolton, 2011; Philippon, 2010; Santomero & Seater, 2000). Poor distribution of resources indicates that both in short term and long term, the desired growth rate might not be possible to attain. For instance, if financial system of an economy practices cream skimming that is a lot of skilled labor who devote their efficiency to the financial sector's development, the rest of the sectors may not progress well due to the unavailability of necessary human capital, caused delays in development and growth.

We confer that both arguments should entail the following statement: "If development in financial sector is accompanied by real sector's development, it can increase growth of the economy". Beside the channels of balanced economic growth, by definition, the entire sectors of an economy have to progress at constant rate. Particularly, financial and the real sectors of an economy should be balanced and move at a proportionate rate. An economy's growth rate of total output remains affected whenever any of these two sectors do not grows proportionately, with the aim to avoid the accumulation of financial volatility, for those sectors (i.e. real sector) that avail financial services, have to develop adequately fast enough to uphold the demands for financial funds. Persistent or growing competition for financial services indicates that the portion of funds to suboptimal and uncertain projects are small or reducing with the passage of time (because less-efficient project becomes profitless when greater demands for funds rises its relative prices). Likewise, due to rapid growth in financial sector, to stop misallocation of resources, the productive industry should develop sufficiently fast to come up with the ability to compete for these resources.

Hence, we develop our hypothesis that there is positive relationship between financial sector and the real sector of the economy if the financial services development is accompanied by the real sector's growth. To test for this hypothesis, we will consider the empirical growth models include in the relevant literature using time series data for economy of Thailand. It is expected that the progress of capital markets and banks could be more crucial for the growth of the country than the industrial economies, implying that developing economies have more opportunity for financial and economic development.

CHAPTER 3
DATA SOURCES, SPECIFICATION OF MODEL, AND RESEARCH METHODOLOGY

This segment will provide details about sources of the data, model specification and the methodology that we supposed to use in the study.

3.1 Sources of Data

The research organized in this study depend on the secondary sources of quarterly data, perhaps from the quarter 1 of year 1993 to quarter 2 of year 2017. For the authenticity of the results, the data collected for the selected variables from different resources i.e. The Stock Exchange of Thailand, The Bank of Thailand, Thailand's Ministry of Finance and The World Bank (World Economic Outlook) data on Thailand.

The growth of real sector of the economy is represented by GDP as it's extensively used in the recent literature (e.g.: Ductor & Grechyna, 2015; Samargandi, Fidrmuc, & Ghosh, 2015; Law & Singh, 2014). The selection of variables to capture the development of financial sector is a challenging job due to a various reasons. Financial institutions and other agents provide wide-range of financial services. Among all, stock market and banks shows a significant role. So as to capture a true depiction, it is needed to evaluate the different aspects of financial market development, i.e., whether the financial sector of Thailand dominated by stock market or by banks or both. Though, our main objective is to examine the long run relationship. Consistent with the literature, our measures to signify the development of financial sector are the domestic credit to private sector (see for example: Ben Jedidia, Boujelbène, & Helali, 2014; Beck & Demirgüç-Kunt, 2009; Masten et al., 2008), Stock market capitalization (see for example: Ben Jedidia et al., 2014; Owen & Temesvary, 2014; Manganelli & Popov, 2013; Rousseau & Wachtel, 2011;Greenwood et al., 2010), Size of LCY T-Bills and Bond Market (for example,

see: Thumrongvit, Kim, & Pyun, 2013; Bjellerup & Shahnazarian, 2012; Dehkordi, Samerti, & Dehkordi, 2012).

3.2 Specification of the Model

Table 3.1 Description of Variables

Variables	*Abbreviated By*	*Data Source*
Dependent Variable Gross Domestic Product	GDP	The Bank of Thailand
Independent Variables		
Domestic Credit to Private Sector by Banks	LOANS	The Bank for International Settlements
Market Capitalization	MKTCAP	The Stock Exchange of Thailand
Bonds	BONDS	The Stock Exchange of Thailand

Where GDP is the Gross Domestic Product; LOAN: amount of loan provided by the banks; MKTCAP: Capitalization of Stock Market; BONDS: government bonds and the corporate bonds.

The stated equation for the model is as follows:

$$GDP_t = \beta_0 + \beta_1 BONDS_t + \beta_2 MKTCAP_t + \beta_3 LOANS_t + \mu_t \text{ ..... Eq. (1)}$$

3.3 Methodology

The study organizes in this work employs time series data in evaluating the relationship between financial and real sector of Thailand. The time series data required to inspect its stationary. It is recognized as (ADF) Augmented Dickey Fuller test. Dickey and Fuller (1979), supported the structure for working out on test of non-stationary. Hereafter, in brief, the co-integration equation is estimated by employing the test developed by Johansen Juselius (1990), known as Johansen Juselius co-integration test

3.3.1 Stationarity Test

In time series model, it is required to examine the stationary of data. Dickey and Fuller (1979), introduced the structure for working out on non-stationary of data

and it is familiar as Augmented Dickey Fuller (ADF) test. The most considerable part of this method is the testing for unit root.

Where,

$$\Delta yt = \beta_1 + \beta_2 t + \phi_{yt-1} + \chi_i \sum_{t=1}^{m} \Delta y_{t-1} + \varepsilon_t \quad \ldots\ldots \text{Eq. (2)}$$

ϕ and y_t indicates the state of stationarity and the regressors, ε_t is the white Noise, and Δy_{t-1} equals $(y_{t-1} - y_{t-2}), \Delta y_{t-2} = (y_{t-2} - y_{t-3})$ and so on. If calculated statistic appears less than the critical value, *Y*, will considered as stationary.

3.3.2 Co-integration Test

To test for co-integration, the estimation technique used in this study includes the Johansen-Juselius (1990) co-integration test. If the selected variables are stationary at first difference, in that case, Johansen Juselius (1990) co-integration test can be used to examine the results. In which VAR of order *n*:

$$Y_t = A_1 Y_{t-1} + \ldots\ldots\ldots + A_n Y_{t-n} + BX_t + \varepsilon_t \ldots\ldots\ldots \text{Eq. (3)}$$

Where ε_t representing the innovation vector, X_t used as the q-vector of the deterministic variable and Y_t is the k-vector [I(1) of time series variables].

Therefore, VAR can be written as:

$$\Delta Y_t = \rho Y_{t-1} + \sum_{i=1}^{m-1} T_i \Delta Y_{t-i} \varphi X_t + \varepsilon_t \ldots\ldots\ldots \text{Eq. (4)}$$

Here we have, $\rho = \sum_{i=1}^{n} A_i - I$ and $T_i = -\sum_{j=i+1}^{n} A_j$

If matrix ρ comprises reduce rank of ($r<k$), in that case it would be the *k x r* matrices of α and β with rank of *r* i.e. $\rho = \alpha\beta$ and β_{Yt} is the integrated order of zero. So therefore, matrix can be verified by the mean of reduced rank from that of unrestricted VAR.

3.3.3 Error Correction Model (ECM)

Further, a category of multiple time series models is Error Correction Model (ECM) that can directly estimate the speed of adjustment of a dependent variable to its equilibrium as there is a change in an independent variable. Question retained concerning for the long term relationship is, whether the short term effects are permitted on dependent variable. It is explained by the following specification:

$$\Delta GDP = \gamma + \alpha\eta_{T-i} + \sum_{i=1}^{GDP}\beta_{GDP}\Delta GDP_{t-i} + \sum_{i=1}^{GDP}\beta_{MKTCAP}\Delta MKTCAP_{t-i} +$$

$$\sum_{i=1}^{GDP}\beta_{DCPS}\Delta LOANS_{t-i} + \sum_{i=1}^{GDP}\beta_{BONDS}\Delta BONDS_{t-i} + \varepsilon_t \text{ ……. Eq. (5)}$$

Where, α representing the speed at which short run equilibrium is adjusted, γ and ε_t is coefficient and the error term.

3.3.4 Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH) Process

The GARCH model constructed by Engle (1982) can facilitate to describe the financial markets in which volatility might change, it can be more volatile during the periods of financial crises or global events and become less volatile in the periods of relatively stable economic growth. This model is particularly suitable when the objective of the study is to evaluate and forecast volatility. In this study, to see the variations of GDP whether or not can be explained by variations in the financial market, we obtain the variance of GDP using GARCH process.

After getting the variance of GDP, we run the following OLS regression to obtain the results where the null hypothesis is the variations in GDP are not explained by the development in the financial sector.

$$\text{var}.gdp_t = \beta_0 + \beta_1 bonds_t + \beta_2 mktcap_t + \beta_3 loans_t + \varepsilon_t \text{ ….. Eq. (9)}$$

3.3.5 Descriptive Statistics of Variables

Table 3.2 Descriptive Statistics of Variables

Measures	*GDP*	*BONDS*	*MKTCAP*	*LOANS*
Mean	17233740	4087072	17303168	8762401
Median	1695509	2798995	13064428	7569342
Maximum	2539704	11163000	46556324	16937220
Minimum	1043930	274350.0	2589919.	3098822
Std. Dev.	440624.7	3482322	13122233	3743743
Skewness	0.235939	0.577652	0.901143	0.851528
Kurtosis	1.687229	1.907436	2.480203	2.554978
Jarque-Bera	7.946313	10.32440	14.36691	12.65198
Probability	0.018814	0.005729	0.000759	0.001789
Sum	1.69E+08	4.01E+08	1.70E+09	8.59E+08
Sum Sq. Dev.	1.88E+13	1.18E+15	1.67E+16	1.36E+15
Observations	98	98	98	98

Note: *(data for all the variables used is in Million Baht)*

Table 3.2 represents values about descriptive statistics. The average GDP of Thailand is about 17.23 million baht for our study era with the standard deviation of 0.44. An average of issuance volume of bonds is around 4.09 million baht having standard deviation of 3.48. The average of stock market capitalization is 17.30 million baht with the standard deviation of 13.12. The average amount of loans issued by the banks is 8.76 million baht with the value of 3.74 as its standard deviation. Degree of asymmetry/symmetry is checked by the measure of Skewness. Table A indicates that all variables are right skewed. Kurtosis measures peakness or flatness of the data in relation to the normal distribution. Kurtosis statistics confirms that none of the variables are leptokurtic (long tailed or high peak). Rather, all the variables are platy-kurtic (fat or short-tailed). Jarque-Bera is a test of normality. With H_O; Residuals are not normally distributed and H_1; Residuals are normally distributed. The probability statistics shows that all the variables are normally distributed.

CHAPTER 4
RESULTS AND DISCUSSION

Statistical results from empirical analysis are further classified into test of stationarity of variables and its short run as well as long run coefficient estimations.

4.1 Unit Root Test

Testing for the stationarity of the variables which are employed in this study, we end it up with the conclusion that the null hypothesis of non-stationary is rejected at 1% level of significance. Table 5.1 in appendix A contains the result of ADF test.

4.2 Unrestricted Co-Integration Rank Test

Johansen Juselius (1990) developed one of the important tests for examining co-integration which is useful to measure the symbols and magnitude of long run relationship between variables and to provide marginal values for the stated equation (Equ.2). The co-integration vector becomes normalized at GDP. The results of co-integration equation can be viewed in table 5.2 of appendix A where the computed statistics show two co-integration equations at a significance level of 0.05.

4.2.1 Normalized co-integrating coefficients: 1 co-integrating Equation(s)

The coefficients of ß with reference to normalized co-integrating coefficients are indicated in table 5.3 in appendix A with the following equation ***(t-statistics in parentheses)*.**

$$GDP_t = \underset{(2.95)}{0.177}\, BONDS + \underset{(2.00)}{0.038}\, MKTCAP + \underset{(1.56)}{0.091}\, LOANS + \varepsilon_t \quad \text{..... Eq. (10)}$$

The result indicates that all the variables sustain a positive relationship to the GDP. The results of this study show that a one-million-baht increase of amount in the capital market by issuing bonds brings 0.177 million increase to the GDP. It is true from the fact that the development of bond market has greater effects for the firms depending more on external credit because the market allows them for a higher diversity of opinion amongst creditors, while retaining some controls in case of bankruptcy that is not permitted by stock market (Maskus, Neumann, & Seidel, 2005). The bonds market development is positively related to the growth of GDP of the

economy. It is obvious from the argument that bonds are one of the means by which companies fund their business operations (working capital) and expansion (growth capital). As corporations require an increasing amount of working and growth capital as they grow, needs for financing eventually evolve beyond that which can be stably and efficiently met by the banking system alone. That becomes an important inflection point for capital markets, including both government and corporate bond market, development which has become more urgent as financial regulatory reforms compress banks' willingness and ability to lend. The finding is consistent with the literature on the primary impacts of both governmental and corporate's capital expenditures, that is economic growth primarily comes from technological innovation and improved productivity of labor in the private sector (Thumrongvit, Kim, & Pyun, 2013b). The same findings have also been produced by (Gennaioli et al., 2012). While there is some debate about the findings and other empirical research shows inconclusive or mixed results depending on the subset of countries and stages of institutional and economic development, the important role of capital markets in economic development is widely accepted.

In respect of the MKTCAP, a million-baht increase in stock market capitalization leads to increase in GDP by 0.038 million. It is because stock market is an essential source of funding to the businesses, either from the introductions of stock exchanges or via issuance of new shares. This means that in the presence of more developed capital market, firms can easily get access to the new capital and utilizes the funds in the worthy projects that might lead them to earn more profits. As a result, firms gets bigger and have more value, if the businesses making profits out there, then the economy is growing and that is how it contributes to the GDP. In addition, developments of stock markets are essential for the growth of equity of both businesses and households (Bjellerup & Shahnazarian, 2012). Our estimation is consistent to the literature largely taking into account the relationship of said variables. A study by David et al., (2014) in a cross-country analysis stating both stock markets development and banks found to be positively related to the real output of the economies.

Talking about the loans provided by the banks (LOANS), our findings suggest that 1-million-baht increase in the loan provided by the banks raises GDP by 0.090

million baht. The positive relationship between loans and GDP can be explained from a theoretical perspective in several ways. Positive effects might come directly from improved allocation of capital and risk sharing. More importantly, development of money market can stimulate growth indirectly. Increased competition among financial institutions leads to reduced cost of borrowing and higher efficiency (Levine, 2000). This stimulates the demand for funds and increases the size of domestic financial markets. Money market also facilitates the growth process through improvements in the institutional framework, i.e. improved regulation and corporate governance that augment the overall stability and reduce problems of asymmetric information. Consequently, the effects of well-established banking system should be reflected through size-based measures of financial development. The evidence is consistent with (Masten et al., 2008), they argue that credit to the private sector plays important role as developing countries benefits considerably more from money market development and it is a key driver for economic growth. The same results were found by (Thumrongvit et al., 2013b).

4.3 An Analysis of Short-Run Dynamics

A category of multiple time series models is Error Correction Model (ECM) that can directly estimate the speed of adjustment of a dependent variable to its equilibrium as there is a change in an independent variable. ECM is one of the ways to explain the multivariate relationships characteristics of economic series.

The Error Correction Model identifies the possibilities of short run relationships. The results of ECM in table 5.4 in Appendix A show that value of Error Correction Co-integration's coefficient equation is 0.22. It indicates that 22% of disequilibrium corrected in each quarter. All variables are correlated to the GDP in different directions at different quarters lag. The summary of correlation of variables to GDP is explained in the table 4.1.

Table 4.1 Summary of Correlation of Variables

Lags	Positively Correlated Variables to GDP	Negatively Correlated Variables to GDP
At one quarter lag	MKTCAP, LOANS	BONDS
At two quarter lag	BONDS, LOANS	MKTCAP
At three quarter lag	MKTCAP	BONDS, LOANS
At four quarter lag	LOANS	BONDS, MKTCAP
At five quarter lag	LOANS	BONDS, MKTCAP

4.4 Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH) Process

A GARCH model constructed by Engle (1982) can facilitate to describe the financial markets in which volatility might change, it can be more volatile during the periods of financial crises or global events and become less volatile in the periods of relatively stable economic growth. This model is particularly suitable when the objective of the study is to evaluate and forecast volatility. In this study, to see the variations of GDP whether or not can be explained by development in the financial market, we estimate the variance of GDP by employing GARCH (1,1) model. After getting the series of variance of GDP, results of Johansen Juselius Co-integration test confirmed that there is no co-integration equation(s) exists between the variables. Therefore, simultaneous estimation of GDP variance and the associated volatilities caused by financial variables estimated by using the following equation;

$$GARCH = C_1 + C_2 * RESID(-1)\text{^}2 + C_3 * GARCH(-1) + C_4 * D(BONDS) + C_5 * D(MKTCAP) + C_6 * D(LOANS) \ldots\ldots Eq.(11)$$

Results of the above estimated equation are stated as following *(also reported in table 5.5 of Appendix A).*

Table 4.2 Results of Volatility Estimation

Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Variance Equation			
C	1.42E+09	4.64E+08	3.072737	0.0021
RESID(-1)^2	0.294486	0.119961	2.454858	0.0141
GARCH(-1)	-0.116023	0.088298	-1.313988	0.1889
D(BONDS)	440.7658	2061.457	0.213813	0.8307
D(MKTCAP)	-301.5612	211.8304	-1.423597	0.1546
D(LOANS)	-789.0988	1862.573	-0.423661	0.6718

According to the results in table 4.2, the coefficients, its z-statistics, and probability values of all the regressors are statistically insignificant that led to the acceptance of null hypothesis for all the explanatory variables which is none of the variable causes the variations in GDP. As per our estimation of the Thai economy, it follows that as the size of the capital market in terms of issuance of bonds and stock; and the money market in respect of providing loans by the banks increases, it will not cause the GDP to fluctuate overtime. While working on the sample of Turkish economy, similar results were identified by Alper and Anbar (2011). The evidences in this study suggest that one essential element for the dampening of recessions and to stimulate the economy is the well-developed financial system that allows the economy to have more stable events. Though, both the stock and the bond market can decrease volatility by allowing, for example, aimed to have better risk management in firms. In this respect, our results on financial sector's development add flesh to Rousseau and Wachtel (2011) findings with regards to smoothing effects of financial market development on real sector's productivity.

4.5 Robustness Check

On the measure of production side of GDP, it contains many segments which contribute in accumulation of GDP at its aggregate level. One of the important segments is the financial intermediation that is almost 10% of the GDP. As we are considering the financial variables as our right hand side variables, but some part of it in terms of financial intermediation is already included in calculation of real GDP. Though, to remove its impact and to find out the pure effect of financial market development on the GDP of the economy, we subtract the amount of financial

intermediation from the real data of GDP and perform all the analysis again to check whether the relationship is different.

The results were found robust and consistent with the same sign of coefficients as our earlier analysis in the case of Johansen Juselius Co-integration test and the Error Correction Model (ECM). While observing the associated volatilities caused by the development of financial sector, the only variable LOANS found statistically significant with the rejection of null hypothesis that none of the variable causes the variations in GDP. In this case, our estimation for one of measure of financial development LOANS is different from previous analysis, stating that development of money market could lead to the fluctuations in GDP. This might be true because excessive financial deepening or too rapid growth of credit may have led to both inflation and weakened banking systems which in turn gave rise to growth-inhibiting financial crises. Excessive financial deepening may also be a result of widespread financial liberalizations in the late 1980s and early 1990s in countries that lacked the legal or regulatory infrastructure to exploit financial development successfully. Taking into account the capital market development in terms of issuance of bonds and stock, our results are robust and consistent with the previous analysis by arguing that it will not causes the GDP to fluctuate overtime. The results for robustness check are reported in table 5.6 to table 5.9 which can be found in Appendix B.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

In this study, we have examined (i) the relationship between financial and real sectors of the Thai economy, (ii) the effects of financial market development on the growth of the overall economy, and (iii) to capture the negative impacts of the financial sector's development, we analyzed that variations in GDP whether or not explained by the development of financial sector in terms of its expansion in size. The empirical tools employed in this study based on the technique of Johansen Juselius Co-integration test, Error Correction Model, Granger Causality and GARCH process. Normalized Co-Integration Coefficient: 1 Co-integrating equation confirms that both the elements of capital market (i.e. bonds and stock markets) and the money market (i.e. credit to private sector by banks) bears a positive relationship to the GDP. Consistent with past studies, our results show that both markets help promoting economic growth.

5.1 Conclusion

Previous studies have mostly dedicated its focus on the positive role of development in banking sector and stock market on economic growth. The study in this paper enhances the analysis by adding bond market as third key element of the financial market, a factor that has largely been ignored in the literature. Our study contributes to the empirical literature with the findings (i) that there is a significantly positive relationship between economic growth and the expansion of stock market, (ii) that there is a positive relationship between bonds market and economic growth, (iii) the contributing role of bank credit to economic growth is also positive with the development of financial structure of the country from the period 1993 to 2017 covered in our study, and (iv) as far concerned the variations in GDP caused by the financial market development, in our results, there are no evidences found that any of the three components of financial sector causes volatilities to the GDP of the economy.

5.2 Recommendations

The findings endorses earlier studies: the expansion of stock market together with development in financial structure of the economy contributes to the economic growth via improved labor productivity and technological innovations in the private sector (Ductor & Grechyna, 2015). However, in this study we have not dealt with the types of bonds (i.e., floating rates, fixed, or zero-coupon bonds) or bond derivatives (i.e., bond futures and/or options), it is due to the reason that bond market complements banks and stock market in deepening the financial sector of the economy. For example, in the bond market absence, banks are likely to become over-capitalized and it may lead banks to make sub-optimal or misallocation of loans. Alternatively, a market with a well-established bonds system, where investments from banks in bond market, and in so doing, decreases information asymmetries, which can facilitate to promote efficient usage of funds. That's why World Bank insisted developing economies to speed up the deepening process of their local bond markets enough before the financial crises in Russia, Asia, and Latin America in 1990's (Thumrongvit et al., 2013b).

We can infer that differences in the financial markets' composition and institutions do matter, as these three major sections – bond market, stock market, and banks– do not develop and grow simultaneously, but at a different level of their growth they complement each other. Our findings are consistent with existing studies, suggesting that inter-dependency exists between financial sector and real sector technologies, which in turn determines the effect of the financial sector growth on the GDP growth. These findings could serve as additional guidance for macro-prudential policy regulations.

The outcomes of this study suggest several promising directions for future research. First, it would be interesting to test the nexus between the financial and real sector technologies and economic growth for the panel of different countries. In addition, the effect of financial market development, following sudden changes in the political regime, would be interesting to study. Finally, conditional on the availability of appropriate forecasting techniques (see Gadea-Rivas & Pérez-Quirós, 2015), technological progress in different other sectors could be used as a predictor of recessions.

5.3 Policy Implications

Finally, the study offers an empirical basis for promoting financial and economic development. It has two important policy implications, especially for developing countries. First, to gain sustainable economic development, it is desirable to further undertake financial reforms. Second, to take advantage of the positive interaction between financial and economic development, one should liberalize the economy while liberalizing the financial sector. In other words, strategies that promote development in the real economy should also be emphasized.

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APPENDIX A: Empirical Analysis

Table 5.1 Results of Augmented Dickey-Fuller Test (ADF)

Variables	t-*Statistics*	*Probability*	*Conclusion*
GDP	-10.80**	0.0000	I (1)
BONDS	-4.15**	0.0013	I (1)
LOANS	-7.58**	0.0000	I (1)
MKTCAP	-6.77**	0.0000	I (1)
Note: The null hypothesis is that the series is non-stationary, or contains a unit root. The rejection of null hypothesis for ADF test is based on **1% level of significance by AIC criteria			

Table 5.2 Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized		*Max-Eigen Statistics*	*0.05*	
No. of CE(s)	Eigenvalue	Statistics	Critical Value	Prob.**
None *	0.274	29.530	27.584	0.027
At most 1 *	0.228	23.918	21.131	0.019
At most 2	0.107	10.393	14.264	0.187
At most 3	0.021	2.023	3.841	0.154

Max-Eigenvalue test specifies 2 co-integrating eqn.(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5.3 Normalized co-integrating coefficients: 1 co-integrating Equation(s)

GDP	*1.00*		
	Coefficients Standard	Standard Error	t-statistics
BONDS	0.177	0.060	2.95
MKTCAP	0.038	0.019	2.00
LOANS	0.091	0.058	1.56

Table 5.4 Results of Error Correction Model

		Dependent Variable = GDP
Independent Variable	Coefficients	t-statistics
Constant	0.00	0.84
D(GDP(-1))	-0.01	-0.13
D(GDP(-2))	0.18	1.27
D(GDP(-3))	0.08	0.63
D(GDP(-4))	0.12	1.03
D(GDP(-5))	0.17	1.52
D(BONDS(-1))	-0.01	-0.58
D(BONDS(-2))	0.01	0.45
D(BONDS(-3))	-0.01	-0.65
D(BONDS(-4))	-0.03	-1.30
D(BONDS(-5))	-0.07	-2.79
D(MKTCAP(-1))	0.02	1.50
D(MKTCAP(-2))	-0.00	-0.48
D(MKTCAP(-3))	0.01	0.96
D(MKTCAP(-4))	-0.01	-0.61
D(MKTCAP(-5))	-0.00	-0.57
D(LOANS(-1))	0.05	0.52
D(LOANS(-2))	-0.12	-1.20
D(LOANS(-3))	-0.09	-0.95
D(LOANS(-4))	0.12	1.23
D(LOANS(-5))	0.22	2.14
EC (CointEq1)	-0.23	-2.76
R^2 = 0.37		
F-Statistics = 1.99 Adjusted R^2 = 0.19		

Table 5.5 GARCH Process

Dependent Variable: D(GDP)				
Method: ML - ARCH (Marquardt) - Normal distribution				
Sample (adjusted): 1993Q3 2017Q2				
Included observations: 96 after adjustments				
Convergence achieved after 71 iterations				
Presample variance: backcast (parameter = 0.7)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Variance Equation			
C	1.42E+09	4.64E+08	3.072737	0.0021
RESID(-1)^2	0.294486	0.119961	2.454858	0.0141
GARCH(-1)	-0.116023	0.088298	-1.313988	0.1889
D(BONDS)	440.7658	2061.457	0.213813	0.8307
D(MKTCAP)	-301.5612	211.8304	-1.423597	0.1546
D(LOANS)	-789.0988	1862.573	-0.423661	0.6718
R-squared	-0.202968	Mean dependent var		15502.30
Adjusted R-squared	-0.190437	S.D. dependent var		34590.44
S.E. of regression	37740.64	Akaike info criterion		23.80361
Sum squared resid	1.37E+11	Schwarz criterion		23.96388
Log likelihood	-1136.573	Hannan-Quinn criter.		23.86839
Durbin-Watson stat	1.817268			

APPENDIX B: Results after Checking for Robustness

Table 5.6 Results after Checking for Robustness (Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized		*Max-Eigen Statistics*	*0.05*	
No. of CE(s)	Eigenvalue	Statistics	Critical Value	Prob.**
None*	0.334	37.417	27.584	0.002
At most 1*	0.243	25.626	21.131	0.010
At most 2	0.107	10.455	14.264	0.183
At most 3*	0.042	3.960	3.841	0.046
Max-Eigenvalue test specifies 2 co-integrating eqn.(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				

Table 5.7 Normalized co-integrating coefficients: 1 co-integrating Equation(s)

GDP	*1.00*		
	Coefficients Standard	Standard Error	t-statistics
BONDS	0.194	0.009	21.55
MKTCAP	0.044	0.020	2.20
LOANS	0.041	0.032	1.28

Table 5.8 Results of Error Correction Model

		Dependent Variable = GDP
Independent Variable	Coefficients	t-statistics
Constant	0.00	0.86
D(GDP(-1))	-0.00	-0.02
D(GDP(-2))	0.19	1.34
D(GDP(-3))	0.08	0.61
D(GDP(-4))	0.10	0.82
D(GDP(-5))	0.14	1.31
D(BONDS(-1))	-0.01	-0.43
D(BONDS(-2))	0.01	0.57
D(BONDS(-3))	-0.01	-0.54
D(BONDS(-4))	-0.02	-0.82
D(BONDS(-5))	-0.07	-2.60
D(MKTCAP(-1))	0.01	1.00
D(MKTCAP(-2))	-0.01	-0.71
D(MKTCAP(-3))	0.00	0.54
D(MKTCAP(-4))	-0.01	-0.67
D(MKTCAP(-5))	-0.01	-0.98
D(LOANS(-1))	0.03	0.28
D(LOANS(-2))	-0.09	-0.90
D(LOANS(-3))	-1.10	-0.99
D(LOANS(-4))	0.08	0.82
D(LOANS(-5))	0.27	2.59
EC (CointEq1)	-0.26	-2.94
R^2 = 0.36		
F-Statistics = 1.92 Adjusted R^2 = 0.17		

Table 5.9 GARCH Process

Dependent Variable: D(GDP)				
Method: ML - ARCH (Marquardt) - Normal distribution				
Date: 06/28/18 Time: 02:56				
Sample (adjusted): 1993Q2 2017Q2				
Included observations: 97 after adjustments				
Convergence achieved after 11 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(1) + C(2)*RESID(-1)^2 + C(3)*GARCH(-1) + C(4)*D(BONDS) +				
C(5)*D(MKTCAP) + C(6)*D(LOANS)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Variance Equation			
C	3.79E-05	1.86E-05	2.041605	0.0412
RESID(-1)^2	0.203068	0.092480	2.195793	0.0281
GARCH(-1)	0.570813	0.099398	5.742678	0.0000
D(BONDS)	0.000581	0.000584	0.994150	0.3201
D(MKTCAP)	-3.17E-05	0.000134	-0.236566	0.8130
D(LOANS)	0.002212	0.000552	4.004911	0.0001
R-squared	-0.222750	Mean dependent var		0.009513
Adjusted R-squared	-0.210144	S.D. dependent var		0.020260
S.E. of regression	0.022288	Akaike info criterion		-4.886119
Sum squared resid	0.048184	Schwarz criterion		-4.726858
Log likelihood	242.9767	Hannan-Quinn criter.		-4.821721
Durbin-Watson stat	1.702883			

BIOGRAPHY

NAME	MUHAMMAD AZHAR KHALIL
ACADEMIC BACKGROUND	- Master of Science in Banking & Finance, COMSATS Institute of Information Technology, Pakistan, 2015-17
	-BS Commerce, Bahauddin Zakariya University, Multan. Pakistan, 2010-14
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	-10/15-7/16: Retail Banking Officer, United Bank Ltd. Multan, Pakistan
	-9/14-10/15: Branch Services Officer, Meezan Bank Ltd. Pakistan